Small Business Innovation Research/Small Business Tech Transfer

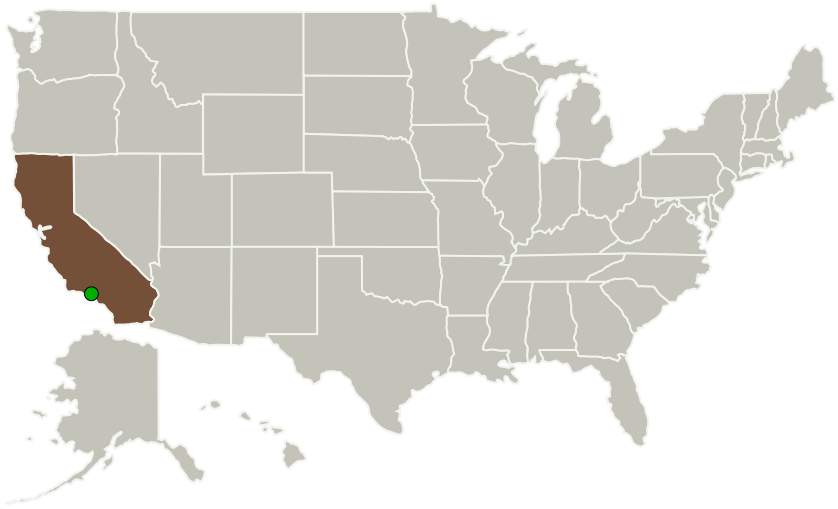
SmallSat Stirling Cryocooler for Earth Science and Interplanetary Exploration, Phase I

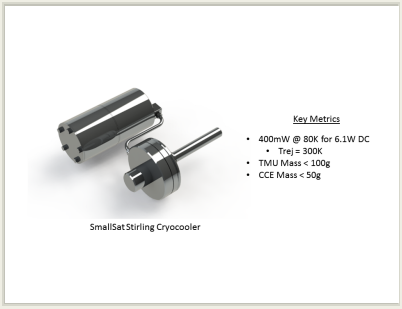
Completed Technology Project (2017 - 2017)

Project Introduction

West Coast Solutions (WCS) and the Georgia Institute of Technology, in collaboration with Creare and Micro Cooling Concepts, proposes the development a SmallSat Stirling Cryocooler (SSC). In Phase I WCS will develop and mature the concept design of a Stirling cryocooler and control electronics, with extreme miniaturization enabled through very high frequency (nominally 300 Hz) operation. Building off previous research conducted by the principles, leveraging recent advances in manufacturing and digital technologies, and supported by analyses and proof of concept experiments, WCS will develop a complete cryocooler system design encompassing both the thermo mechanical unit (TMU) and the cryocooler control electronics (CCE). In Phase II the detailed design for a SSC System will be completed and a high fidelity brassboard system will be built, tested to Technology Readiness Level (TRL) 5, and delivered to NASA. Immediate commercialization in support of NASA, Department of Defense, and commercial low Earth orbit (LEO) missions will follow.

Primary U.S. Work Locations and Key Partners





SmallSat Stirling Cryocooler for Earth Science and Interplanetary Exploration, Phase I Briefing Chart Image

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Organizations Performing Work	Role	Type	Location
Wecoso, LLC	Lead Organization	Industry	Huntington Beach, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Images

Briefing Chart Image
SmallSat Stirling Cryocooler for Earth Science and Interplanetary Exploration, Phase I Briefing Chart Image
(https://techport.nasa.gov/image/128130)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Wecoso, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

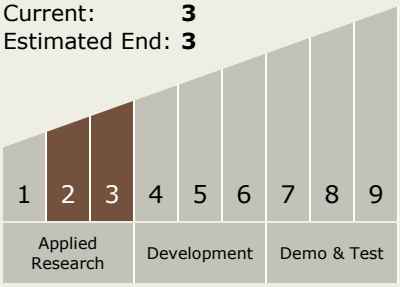
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Carl Kirkconnell

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.6 Cryogenic / Thermal

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System